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ABSTRACT

Recounts the achievement of four Michigan community college teams of faculty who had integrated academic and occupational content--the goals and strategies for which were jointly developed by faculty from different disciplines in traditionally academic and career specialty areas. Describes the case of this integration and explores integration as an educational construct. Looks at the Michigan statewide initiative for integration, which resulted in a project called "Curriculum Development: Integration of Liberal Arts and Occupational Education." This report provides a description of curriculum integration and Tech Prep. It also discusses national perspectives on community colleges' curricular integration and provides descriptions of eight different models as approaches to this endeavor: general education requirements, applied academic courses, cross-curricular efforts, incorporating academic modules in expanded occupational courses, multidisciplinary courses combining academic perspectives and occupational concerns, tandem and cluster courses and learning communities, colleges-within-colleges, and remediation and ESL programs with an occupational focus. Examines the benefits and barriers to curriculum integration. Describes the Wisconsin Instructional Design System, common themes in the Michigan experience, initial feedback, student and faculty experiences, implementation considerations, future opportunities and directions, and short-term recommendations. Concludes with first-year project summaries from Delta, Henry Ford, Macomb County, and Northwestern Michigan Colleges. Contains 12 references. (VWC)

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We've Started Talking, and

Now We're Doing It!

A Perspective on Curriculum Integration

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We've Started Talking and Now We're Doing It!

Introduction

"Let's stop talking about it and do it!" was the challenge in October of 1994. And by the fall of 1995, at least four Michigan community college teams of faculty had done it! The "it" was the integration of academic and occupational content - the goals and strategies for which would be jointly developed by faculty from different disciplines in traditionally academic and career specialty areas. Few other criteria for the projects were established, to enable as much creativity to emerge as might with few rules. In 1996, four additional teams from each of the original schools and four new community colleges were added. Four more schools will be added in the spring of 1997. Participating Michigan community colleges are: Delta, Grand Rapids, Henry Ford, Kellogg, Macomb, North Central, Northwestern, and St. Clair.

A Case for Integration

The proper balance between academic and job-specific preparation has been a topic of extensive debate for decades. This debate is traced back to the nation's founders when Benjamin Franklin's preference was for a pragmatic, utilitarian education while Thomas Jefferson believed that possession of basic academic skills equipped one to move into almost any realm. Career education is midway between a liberal and a technical education. The different viewpoints are not likely to be reconciled easily or soon - particularly if the dichotomy of the two persists. As long as we consider the content to be either/or, there will be competition. Today's environment calls for an end of the competitive model and the nurturing of the collaborative one. The question is not that of one versus the other; it's a question of how can we most efficiently and effectively accomplish both to the highest possible levels.

Many factors contribute to the heightening interest in significant curricular reform. Nationally, high drop out and illiteracy rates in some districts have been major forces driving curriculum reform. Employers' criticisms of the schools regarding the preparedness of graduates have been escalating, especially as unemployment is lower and employers have had increasing difficulty in hiring qualified workers. Vocational educators are criticized in some cases for providing overly specific training, while academic educators are criticized for providing instruction that is not connected to the real-world's requirements. Accountability expectations are increasing from many sectors: communities, employers, accrediting agencies, governments, and others.

High-skill workplaces, with flatter organizational structures, place greater responsibilities on each worker for thinking, problem solving, and communications. Individuals need to be better prepared for the high-skill workplace as well as to be productive as lifelong workers, regardless of the nature of the work, as jobs increasingly disappear and virtual corporations are more prevalent.

A 1995 statement from the Advisory Board of the National Center on the Educational Quality of the Workforce (EQW), "On Connecting School and Work," offers the following commentary:

> *Few American employers see schools as effective partners in their search for skilled workers. This growing disconnection between the nation's schools and its businesses threatens to undermine the educational quality of the workforce on which American productivity depends. The challenge is to develop initiatives that require*

neither new funds nor another government agency; rely on the market to create the incentives for firms to invest in human and physical capital; and lower the costs to employers of screening and hiring new workers.

The 1990 amendments to the Carl Perkins Applied Technology Act require that federal money be spent on vocational programs that "integrate academic and vocational education . . . through coherent sequences of courses, so that students achieve both academic and occupational competencies.' (Section 235) The 1988 work of the Commission on the Future of the Community College recommended "*exploring new ways to combine technical and general studies throughout the undergraduate experience,"* and that "*community college faculty should take the lead in closing the gap between the so-called "liberal" and the "useful" arts, particularly by developing "up-to-date programs that integrate the core curriculum and technical education."*

A widely acclaimed 1984 work called Involvement in Learning, Realizing the Potential of American Higher Education by the Study Group on the Conditions of Excellence in American Higher Education asked that "faculties and chief academic officers in each institution should agree upon and disseminate a statement of the knowledge, capacities, and skills that students must develop prior to graduation. It continued in Chapter 8:

We are hereby recommending that postsecondary institutions be less grandiose in their statements of goals and far more specific about their objectives. It is not sufficient that the lists generated by faculty and academic officers recite symbolic terms like "critical thinking," "problem solving," or "creativity." We recognize that not all of the outcomes of an undergraduate education can be specified in such a way to be easily quantified. But this does not relieve us of the responsibility to define the knowledge, capacities, and skills we expect students to attain.

In Chapter 10:

Liberal education requirements should be expanded and reinvigorated to ensure that (1) curricular content is directly addressed not only to subject matter but also to the development of capacities of analysis, problem solving, communication, and synthesis, and (2) ***students and faculty integrate knowledge from various disciplines****. . . But simply adding requirements--or offering students a larger set of liberal arts courses from which to select--does not achieve one of the principal aims of liberal education, the ability to integrate what one has learned in different disciplines . . . the reform of liberal education must be based on collaboration among faculty from different departments; establish specific integrative mechanisms such as senior seminars and theses that require reflection . . . and require that students actively apply learning from different disciplines in individual or group projects that open the windows of their learning to the world beyond."*

The calls for education reform at the postsecondary level have been loud, clear, and consistent. The response has been negligible. In a continuous quality environment, If the constituents we serve are not delighted with our product, for which there appears to be sufficient evidence, then approaching

our work differently must become a priority.

Integration as an Educational Construct

An interesting phenomena is that most of the thrust is for integrating academic content into occupational courses vs. the alternative, integration of career specialty instruction into academic courses. As School-to-Work programs gain momentum nationally, with their emphasis upon the need to provide ALL students with work-based experiences, changes may be anticipated. Occupational students all have required academic and/or general education requirements as a part of their programs of study, but transfer students do not typically have required occupational experience. If ALL students will be preparing for work, regardless of when they plan to enter their careers, then ALL students' programs of study should incorporate learning of both academic and occupational content.

There are multiple curriculum models. A simple one which should serve most purposes well is the following:

Step 1: Diagnosis of needs;
Step 2: Formulation of objectives
Step 3: Selection of content;
Step 4: Organization of content
Step 5: Selection of learning experiences
Step 6: Organization of learning experiences; and
Step 7: Determination of what to evaluate and of ways and means of doing it

If these steps are followed and faculty work in cross-disciplinary collaborative groups, integration as a dominant educational or curricular theme should emerge.

Description of the Michigan State-Wide Project

The state-wide initiative came as a result of a challenge issued by Dr. James Jacobs as an outgrowth of a lively discussion at the annual Trends in Occupational Studies Conference in Grand Rapids, Michigan, in October of 1994. A session featuring how general education contributes to the development of workplace skills was presented by representatives of the liberal arts community. The room was crowded as people wanted to learn more about how Michigan educators would continue to develop the skills important for success in the workplace. Trends attendees are primarily occupational faculty and administrators, which comprised the great proportion of the audience. Not unlike the differences in philosophy which have persisted since the 1800s between career educators and liberal arts disciples, different viewpoints were evident within the audience. The question-and-answer session evolved into a challenge of the assumptions general education courses are primary contributors to the development of critical thinking, communications, and teamwork skills. When time had elapsed, there was still much discussion. In follow-up conversations, it was suggested that it was possible (or even probable) that many occupational courses could also accomplish the goals that we all shared for our students. The presenters, leaders in the LAND organization, invited Dr. James Jacobs and Roberta Teahen, of Macomb and Northwestern, respectively, to posit their perspective as presenters at their annual conference the next February.

During the interim period, many conversations were held between the pending presenters and the Michigan Department of Education to explore whether resources could be committed to continuing the dialogue. The October meeting suggested that our mutual understandings were not strong but that the importance of improving our communication about our common goals was critical. There would be little value in proving one or the other point of view if we did not have a vehicle for seeking changes. Jim Folkening of the Michigan Department of Education agreed to fund a pilot project in Michigan if a small number of schools wished to pursue the topic further. At the February 1995 meeting, we were not only able to explain why we think there are alternative methods for achieving our shared goals - and that the very limited research which exists may corroborate our hypothesis - but that we were eager to work toward continuing to assure that the goals are accomplished - through the joint development of appropriate content and strategies.

Individuals attending this LAND session were invited to become partners. Partners committed to participation in a summer training session and development of an integrated course or approach before the next meeting of Trends in early October. We promised that we could report back to our colleagues that we had stopped talking and had started doing.

The project would be called "Curriculum Development: Integration of Liberal Arts and Occupational Education." Consultants from the Wisconsin Instructional Design System (WIDS) were invited to conduct a two-day seminar with faculty and administrative teams in a July workshop in Traverse City.

The purposes of the pilots are:

1. To develop curricular learning models and/or courses which integrate liberal arts and general education in occupational programs.
2. To identify and document the collaborative process of work between liberal arts and occupational faculty which results in formulating the new model.
3. To document and illuminate the barriers which interfere with the integration process at a team level.

Curriculum Integration and Tech Prep

Curriculum development associated with the Tech Prep statewide and national implementation has been more active at the K-12 level than in community colleges. Integration of academic and occupational learning is a tenet of the Tech Prep philosophy, which is designed to serve the majority of students who need to be better prepared for work and for continued education. Applied academic courses were a common response in K-12 as many Michigan schools moved to implement different systems. Many schools utilize CORD's materials for Applied Mathematics, Applied Communications, Principles of Technology (an applied physics), and Bio-Chemistry (the newest addition to the courseware). Students in most Michigan high schools have the opportunity to participate in very different learning experiences than were evident just a few years ago, in large part because of the pervasiveness of the Tech Prep effort in local communities.

Few examples exist of entirely new courses being developed at the post-secondary level, even though community colleges are major partners in the state's and their communities' efforts. Courses which existed before, such as Technical Math and Business Communications, continue to be offered, but little other integration appears to be underway. In fact, many colleges "dismissed" the need to develop new courses or approaches, taking a wait-and-see approach to whether students would really come out of schools with different and higher skill levels. The jury is still out on these outcomes, even though the research is now underway, but it is clear that the community colleges' "customers" have had enough different experiences in their K-12 education to expect a different learning environment at the college level. Integrating academic and occupational content is one important way to develop a different and effective learning environment.

A January 24, 1995, Community College Times opinion editorial by J. Michael Horan, director of Mid Florida Tech Prep Consortium, called "Tech Prep Update," with a subtitle of "Community College Reform and Tech Prep: Leading, Following, or Business as Usual?" expressed concerns about the progress with Tech Prep among community colleges. He wrote:

> *Concerns that community colleges have failed to accept the challenges of curriculum reform are being voiced nationally. For example, Pennington (1994, p. 2) suggests: 'There may be more innovation happening in the high schools than in many community colleges in terms of contextual learning, learner-driven teamwork, project-oriented learning, and interdisciplinary activities." Another states that 'changes in teaching and curricula are underway at the secondary level, but are moving at a slower pace at the community college level.'*
>
> *Community college general education 'common core' courses would seem to be an ideal arena to study for any substantive changes as a result of the tech prep initiative. The need to integrate academic and technical education is a vital reform element that will serve the best interest of students. It could be argued that for genuine and lasting change to occur at the postsecondary level, traditional academic courses such as Freshman Composition and College Algebra must do more than prepare students for entrance to a university."*

A recommendation in the Michigan project was that efforts be made with each pilot project to link its work to that of the local Tech Prep consortium. In some instances, funding for course development by the instructors came from the local consortium. The emergence of the School-to-Work movement is a natural extension of Tech Prep's school-based efforts as students will now be required to have meaningful work-based learning experiences as a part of their educational programs. A fundamental expectation is that the school-based learning will be connected to workplace requirements - an expectation that has not always been met by education.

One of the several Tech Prep books produced by Dale Parnell, Dan Hull, and others through CORD was originally called LogoLearning. (In a later printing the book had a new title.) These authors argue that we must turn the system right-side-up by making teaching and curriculum the

variables and results the constant. Their right-side up principles follow:

1. Purpose Directs the Organization
2. Real-life Problems Take Precedence Over Subject-Matter Isolation
3. Students Gain Understanding Through Problem Solving
4. Academic and Vocational Concerns Are Integrated Whenever Possible into an Applied-Learning Process
5. Competence is the Constant; Time the Variable

LogoLearning is not an either/or education. Instead, it is an integrated approach that provides a bridge between:

- purpose *and* outcome
- head *and* hand
- academic *and* vocational
- knowing *and* doing
- theory *and* practice
- time *and* competence
- education *and* training

National Perspectives on Community Colleges' Curricular Integration

The work most directly related to our endeavor was reported in Norton Grubb's NCRVE research report entitled "A Time to Every Purpose: Integrating Occupational and Academic Education in Community Colleges and Technical Institutes" (1992). In this document, Grubb describes the eight community college approaches to integration.

1. General Education Requirements
2. Applied Academic Courses
3. Cross-Curricular Efforts: Incorporating Academic Skills in Occupational Programs
4. Incorporating Academic Modules in Expanded Occupational Courses
5. Multidisciplinary Courses Combining Academic Perspectives and Occupational Concerns
6. Tandem and Cluster Courses and Learning Communities
7. Colleges-Within-Colleges
8. Remediation and English as a Second Language (ESL) Programs with an Occupational Focus

Because these establish a context for the review of integration, a description of each of these models follows.

Model 1

General education requirements are the most frequent form of integration. In most institutions, programs of study require the taking of several such courses. The courses are not generally modified to meet the unique requirements of different student groups. If the student does not complete the program, the likelihood is high that s/he may not complete the general education requirements, since this is a part frequently left to last by the career-focused student. Consequently, the requirement results in no improvement in many students' performance because

they do not participate. The courses do not encourage the integration of competencies; this is left for the student to assimilate.

Model 2

Applied academic courses are expanding greatly at the secondary level, and they are also a common approach at the postsecondary level. Courses like business math and technical writing are examples. Most of these courses have been available for many years. They are generally required for only students of occupational programs, resulting in some concerns about tracking. Content from traditional academic courses are generally adapted with practical applications.

Model 3

A common cross-curricular effort is "writing across the curriculum." In this model, all faculty are encouraged to incorporate more of this skill into their courses both as a way of teaching writing and as a way of reinforcing learning. There are other examples, but they are far less common than the writing program.

Model 4

The incorporation of academic modules into expanded occupational courses is typically the effort of one or a few instructors with an interest in introducing additional content. One frequent example is the introduction of ethics into an occupational course. The focus is on a specific course.

Model 5

In multi-disciplinary courses it is common for academic and occupational faculty to work together in the development of content which takes broad perspectives. Themes are a frequent approach, as students explore topics such as Work or Technology from its many perspectives: occupational, literary, psychological, etc. The extent of this type of course is attributed primarily to the infusion of resources from the National Endowment for the Humanities. When the funding ends, many of these courses also do.

Model 6

The tandem and cluster-course or learning communities approach is to develop two or three or more complementary courses that students take simultaneously. This allows instructors to coordinate the content and the assignments to reinforce material from one or more of the other courses. Not only is the linkage in content enhanced but the sense of community among students is also enhanced, as they get to know each other better from their multiple classes.

Model 7

Colleges-within-colleges are extensions of model 6, where students take all of their classes together. This approach is less flexible, especially for the adult student, because of the time commitments. There are few examples of this approach. However, this is an increasingly popular model in high schools with the development of career and trade academies.

Model 8

Remediation and English as a Secondary Language with an occupational focus provides greater motivation for students who feel that they are making progress with their occupational goals while developing their basic skills.

Most of the Michigan projects are forms of Models 5 and 6. Models 6 and 7 have similar aims, to provide a structure for collaboration among instructors and for two or more courses to reinforce one another, where instructors will know what other knowledge the students should have and common applications can be developed. Grubb cites four schools as appearing most active nationally in integration efforts: Bunker Hill Community College, Boston, MA; Southern Maine Vocational Technical College, Portland, OR; Springfield Technical Community College, Springfield, MA; and LaGuardia Community College, Long Island, NY.

Norena N. Badway presented at the 1996 Summer Curriculum Integration Workshop in Traverse City on "Models of Integrating the Community College," based extensively on the research from the National Center for Research in Vocational Education. In her earlier work, she suggested the following strategies:

- Infuse Work-Related Applications into Academic Courses
- Infuse Academics into Vocational Courses
- Infuse SCANS Skills into Vocational or Academic Courses
- Simulate Workplace in Classroom
- Applied Academics
- ESL in Occupational Context

Multidisciplinary examples include:

- Combine Academic and Vocational Perspectives
- Content such as History of American Health Care or Sanitation in Biology
- Workplace, such as Technology and Civilization or Working in America
- Capstone Courses

A third approach is Clusters of Courses:

- Co-enrollment in two or more courses
- Linked - such as Business Law, Introduction to Business, and Ethics
- Learning Communities - often a freshman group
- College Within College - Sometimes License or Industry- Developed Programs

At her Summer 1996 workshop, she took an "educational domains" approach to career preparation - or workforce development. She recommends that these domains be included in every certificate and degree program, including those intended for transfer and the liberal arts. She advises that we include the domains, select appropriate strategies (models of integration), and then evaluate, using assessment and course/program outcomes to measure.

The domains to be included are:

- Job Specific/Technical
- Foundation Academics

- Career Exploration and Decision Making
- Generic Technical
- Productivity
- Work Organization
- Citizenship and Personal Development

Each of the above is described in more detail in her conference handouts, and forms are provided for faculty to use in applying these domains to their current requirements in specialized courses, general education requirements, and electives.

She identifies the following strategies for Integrating Career Preparation:

- Infusion
- Hybrid - Applied
- Multi-disciplinary
- Tandem/Learning Communities
- Authentic Assessment

The successful models rely heavily upon collaboration and they move away from the isolated course as the basic unit of postsecondary institutions. Both top-down and bottom-up efforts are required to assure that the innovation is sustained.

Other Integration Perspectives or Models

The literature reviewed included many approaches to and models of integration. Project participants reviewed much of the published material, with particular emphasis on the preceding and following work.

In Grubb's description of secondary models, he identifies the following elements of success:

- Vision and Commitment from All Levels
- Consistent Support from District Administrators and State Officials
- New Resources for Funding
- Autonomy for Teachers
- Teacher Training and Retraining
- Evaluation of Efforts
- Adequate Time for Implementation

In The Mindful School, How to Integrate the Curricula, Robin Fogarty classifies integration models in the following ways:

- Fragmented - The traditional model of separate and distinct disciplines, which fragments the subject areas.
- Connected - Within each subject area, course content is connected topic to topic, concept to concept, one year's work to the next, and relates idea(s) explicitly.
- Nested - Within each subject area, the teacher targets multiple skills: a social skill, a thinking skill, and a content- specific skill.
- Sequenced - Topics or units of study are rearranged and sequenced to coincide with

one another. Similar ideas are taught in concert while remaining separate subjects.

- Shared - Shared planning and teaching take place in two disciplines in which overlapping concepts or ideas emerge as organizing elements.
- Webbed - A fertile theme is webbed to curriculum contents and disciplines; subjects use the theme to sift out appropriate concepts, topics, and ideas.
- Threaded - The metacurricular approach threads thinking skills, social skills, multiple intelligences, technology, and study skills through the various disciplines.
- Integrated - This interdisciplinary approach matches subjects for overlaps in topics and concepts with some team teaching in an authentic integrated model.
- Immersed - The disciplines become part of the learner's lens of expertise; the learner filters all content through this lens and becomes immersed in his or her own experience.
- Networked - Learner filters all learning through the expert's eye and makes internal connections that lead to external networks of experts in related fields.

The first three models are within single disciplines; the next five cross several disciplines; and the final two are both within and across learners. An extensive number of diagrams and exercises in the book help to explain the concepts.

Fogarty's premise is that of an integrated learner; where "*learners must continually make connections. As they proceed on their journeys, they single-mindedly dig into an idea and at the same time they network with others for breadth across related fields.*"

Miami University

Miami University in Ohio also has contributed to the integration topic. Team members from Macomb explored this university's approach. In the Miami faculty's Guide to Interdisciplinary Syllabus Preparation, they discuss levels of integration as multidisciplinary, pluridisciplinary, cross-disciplinary, and interdisciplinary. Although their terminology is different, they utilize many of the Wisconsin Instructional Design System approaches, discussed later in this paper. They have a "hook" or "grabber" at the beginning that draws students into the issue (the Motivate of the WIDS Learning Cycle); explicit subtexts - the 'real' education agenda - which reads much like Core Abilities, etc. Their Interdisciplinary Course Evaluation by Students may be a useful tool for assessment of Michigan's projects.

Learning Communities

A valuable resource for individuals interested in learning communities is the New Directions for Teaching and Learning Series, Spring 1990 edition, called "Learning Communities: Creating Connections Among Students, Faculty, and Disciplines." In the chapter called Learning Community Models is a helpful diagram which explains learning community types. These are:

- Linked Courses
- Learning Clusters
- Freshman Interest Groups
- Federated Learning Communities
- Coordinated Studies

Level 3 - Evaluate behavior of self within two theoretical frameworks
Level 4 - Demonstrate effective social interaction behavior in a variety of situations and circumstances

In majors and areas of specialization:

Level 5 - Demonstrate effective interpersonal and intergroup behaviors in cross-cultural interactions
Level 6 - Facilitate effective interpersonal and intergroup relationships in one's professional situation

Kathleen Harris and SRS

Kathleen Harris who works with California State University, Sonoma, is also recognized as a leader in curricular innovation and integration. She has recently conducted many workshops in Michigan with secondary educators and was a featured presenter at the February 1997 Tech Prep Conference in Grand Rapids. Among Harris's premises is that when it's something students care about, they will learn it; she argues for having curriculum jointly developed and contextual. She starts from a foundation of common goals and learning objectives. She gives examples of how to contextualize content to meet students' interest and experience. Important in her approach is the maintenance of high standards. Kathleen Harris is scheduled to return to Michigan for continued work with educators.

Her approach relies heavily upon Learning in Context - the making of connections. Her model includes learner profile, knowledge, worth, and function intersecting to create emotional investment which results in long-term retention and transferability of knowledge. Her student-centered, "emotional" approach is consistent with much recent literature about learner motivation and their need to be engaged to effectively learn.

The emphasis on standards is intended to dispel some continuing concerns of many that applied courses are less rigorous. She recommends that instructional planning begin and end with validated educational standards which are cross-curricular. These standards must be life-long, transferable skills which reflect community and workplace standards. This approach is very consistent with current instructional design theory which requires that instructional planning begin with identification of the real-world performance which is required. From real-world performance evolve goals, objectives, lessons, and evaluation strategies. To the extent that it is possible, this approach contends that all coursework must simulate the real-world conditions and performance. Refer to the extensive publications of Dr. Stephen Yelon of Michigan State University for additional information on this instructional design system.

Kathleen recommends the following steps in the training of teams for interdisciplinary/integrated curricular approaches:

1. Set student standards
2. Define common mission or vision
3. Agree on strategies
4. Define or describe program

5. Write process
6. Develop assessment and evaluation methods
7. Develop and Implement Action Plan

Many instructional designers would argue that the assessment methods should be defined up-front, because they should simulate the real-world performance which is required for success in the endeavor.

Classifying the Michigan Models

Because each College has approached its tasks differently, it is difficult to categorize the Michigan projects into any one of the classification schemes. However, because the LAND conference is featuring Norena Badway in 1997, an attempt will be made to classify each of the projects for which we have current documentation, according to where it most closely aligns in the schema.

Infusion (*Addition of competencies, applications, or modules from one discipline into another)*

St. Clair's Inclusion of Quality emphasis in English course (but more is planned)
Kellogg's Nursing Courses
Macomb's Surveying/English/Math Courses

Hybrid/Applied (*Blends practical, work-like applications with conventional academic disciplines in a single course.)*

Northwestern's Maritime Program: Maritime Problems infused into Math and Physics
Henry Ford's Technical Physics

Multidisciplinary (*Joins two or more perspectives in a single course.)*

See explanation below.

Tandem/Learning Communities (*Concurrent enrollment in 2-4 courses)*

Delta College (utilizes existing courses)
Note: Northwestern also has some linked classes, which are not a part of this project.
Macomb's Auto Technology (created two half-credit courses to connect to base course)

Authentic Assessment (*Define learning outcomes as ability "to do" instead of "to know". Measures performance instead of solely knowledge.)**

Grand Rapids Manufacturing Skills Standards
Northwestern's I/Q = E^3 Advanced Manufacturing Skills Standards Case Study Project

North Central's plan is still under development. Classifying is somewhat arbitrary, because several have aspects of other categories. For example, each of the models is essentially "multi-disciplinary," in that two or more disciplines are involved. In most instances, at least three have been combined, such as accounting, English, and technology at Macomb; or philosophy, nursing, and English at Delta. Northwestern's plan integrates several disciplines: business, English, manufacturing, math, and visual communications. However, in the Badway model, "multidisciplinary" refers to joining two or more perspectives in a single course, or links academic

and/or career studies; or is co-planned or team taught. In addition, the Northwestern course could also be classified multi-disciplinary because it does propose to combine all of the content areas into one new course.

There are advantages and disadvantages to each approach. Any time new courses must be developed, time commitments expand. Other entities must also be considered, such as curriculum committees, if the course is to be offered for credit. However, there are some advantages to starting with a new slate, as the Henry Ford team found, when there are challenges to eliminate prior content to accommodate new approaches. A limitation of the linked courses and learning communities is their requirement for co-enrollment. Many students, especially occupational ones, are part-time students and full-time workers. In fact, planned linked classes at Macomb and Northwestern have been unable to attract a complete overlap between or among the groups - resulting in some students being in a link and others not. This compromise in the model may diminish the potential value. Expecting all of our students to enroll for two or more full-credit classes may be an unreasonable expectation. At the same time, the advantages of an integrated approach are significant enough that efforts must be made to assure that all students have access to this improved learning opportunity.

An interesting model was presented by an Oakland Community College team at the Fall 1996 Learning Communities conference in Frankenmuth. This team expanded the time students spent in class each week by one hour and scheduled three classes they wanted to "integrate" at the same time. Some of their common time each week was spent in shared sessions where students addressed common topics from their particular course lenses: psychology, economics, and sociology, for example. More details will be included in a future Curriculum Integration Newsletter, because it has the advantage of many of the models without the limitations associated with a requirement for students to enroll in more than one course.

Students' schedules, instructors' willingness to change existing courses, and institutional politics must all be considered - in addition to the definition of desired learning outcomes.

Benefits of Curriculum Integration

As more experience is gained in community colleges, the benefit can be more confidently identified, but preliminary findings are that the integration of curriculum will/does yield the following benefits:

- Better meeting the needs of occupational students
- Better educational preparation of transfer students
- Increased mastery of fundamental competencies important for education and work success
- Increased student motivation in academic and developmental courses
- Superiority of contextual instruction
- Incorporation of moral, humanistic, and political perspectives into occupational programs--the general education purpose
- Bridging the independent "islands" of the community college
- Re-energizing the faculty

- Encouragement of innovation and entrepreneurism
- More student-centered curricula
- Improved preparation of students for work
- Enhanced collaboration and teamwork among faculty
- Improved respect among faculty and administrative colleagues
- Development of a community of learners
- Increased retention of students
- Improved grades of students
- Changed teaching practices
- Better career choices
- Scheduling flexibility
- More interaction around teaching and learning issues
- Interdisciplinary cooperation
- Industry partnerships

Barriers to Curricular Integration

The barriers list is nearly as long. Identified in the literature and from discussion of the Michigan faculty teams are the following constraints:

- Universities' acceptance of transfer credit for "new" courses (statewide task forces must address articulation issues)
- Acceptance of competency-based exams or performances
- Reluctance of faculty to change
- Lack of expertise in nontraditional instruction
- Lack of expertise of individual faculty members in disciplines other than their own
- Pervasive disciplinary specialization
- Lack of recent and/or any related work experience
- Perceptions of status differences between academic and occupational faculty
- Lack of leadership in support of curriculum reform
- Lack of resources for release time, planning, purchased materials, and professional development
- The development of the community college as "an archipelago of independent divisions, each serving an independent mission" (Grubb)
- Lack of institutionalization of integration
- Lack of support from administrators
- Lack of support from faculty peers - for many reasons, including a fear that if this form of instruction catches on, students will be attracted away from their classes
- Breaks from tradition; in many instances an established course has little chance to be significantly modified
- Innovation is not a part of the culture

The Wisconsin Instructional Design System

The Wisconsin Instructional Design System (WIDS) was introduced to the teams in 1995 for the system's potential value as a structured curriculum writing approach. Many Michigan educators have experience with Peaks Software, which is similar. A new version of the WIDS materials are

available in February 1997, and the developers say that there are many improvements.

The WIDS system utilizes Core Abilities. Core abilities should:

- Begin with an action verb
- Describe broadest outcomes--abilities, talents, skills (such as communication, critical thinking, information management)
- Be addressed throughout the course
- Identify integrated, transferable skills that are essential to all (and go beyond the context of the course)
- Encourage learners to perform at high levels

Core abilities are threaded throughout the course rather than addressed in specific lessons. A learning cycle is also a central component of the system as settings should be arranged to motivate, learn, practice, and apply. Other components of the WIDS design are Competencies, Performance Standards, Performance Criteria, Performance Conditions, Learning Activities, and Performance Assessments. This approach is very consistent with most current instructional design theory.

Common Themes in the Michigan Experience

While the projects and approaches were different, the process of integration has had many common themes.

- **Innovation** - Each project started with at least one internal champion and then at least some support and encouragement existed to develop the concept. The question for the future: How do we move from here to institutionalization? Should we? Most recognize that community colleges will be threatened if they fail to innovate, because others will.

- **Pedagogy** - Teaching took on new meaning: self-discovery, learning, facilitating, coaching, and other descriptors describe the student **and** teacher roles. None had ever experienced a class like they were creating. The *Sage on the Stage* is clearly out of place in this environment.

- **Disconnect** - The relationship of these new hybrids to regional high school curricula, to other offerings in the community colleges, and especially in recognition in transfer to universities is not developed and potentially problematic. These models are richer than many "applied" courses, but how will they be acknowledged?

- **Communications Skills** - The integration of writing, speaking, and listening were central to each of the projects, demonstrating the extent to which communication skills cut across all disciplines.

- **Target Audiences** - There was a clear target for most of the projects: individual students in a particular program of study, often more mature, and often bringing other experience to the learning setting. The market was specifically identified and the content and delivery

customized. In marketing, this concept would be referred to as "mass customization."

- **Climate/Culture** - These efforts often persisted in environments where many question the validity; faculty involved often received little peer support or encouragement. The most progress was made in the institutions which provided extensive support for the efforts through professional development, grants, technology, administrative encouragement and recognition, and more.

- **Assessment** - All recognized the importance for valid and reliable assessment, but all are still struggling with this challenge. A great need exists for careful documentation, and the development of research evidence will be timely with increased expectations from accrediting agencies and others.

Initial Feedback

Representatives from all of the eight colleges will have presented by the end of the LAND conference in Grand Rapids in February, 1997. Comments from attendees at previous sessions included the following:

> *Very important topics. Excellent information in reference to the direction we must take to further improve career education.*
>
> *The enthusiasm of the teams was overwhelming.*
>
> *Great presentation - Long overdue.*

Attendees have been eager for more details about how courses would fit into traditional educational settings, seeking answers to questions about faculty load, release time, credits, transfer, and more. Unfortunately, there are not yet answers for many of the questions.

Although the courses developed within the projects are quite different and designed to serve different audiences, the consistency among the core abilities is stunning. Whether it is in nursing, manufacturing, automotive design, or physics, the goals of collaboration, communication, thinking, and understanding prevail.

As the NMC course was being developed, insights about the importance of academic topics to the employer community was sought from members of the Advanced Manufacturing National Skills Standards Committee. James Mullarkey, Associate Dean for Career and Workplace Education, at Waukesha County Technical College, wrote:

> *. . . employers do not see a link between academic, general education or liberal arts training and the job. Yet, employers are continually asking for workers adept in oral and written communication--individual and team, better computational skills--especially those related to applied algebra and geometry, and critical thinking skills associated with the job, department, and organization. Finally,*

employers are saying, "Education is not responding to my need." Translated, employers are saying, "Educators are not delivering the skill-based curriculum on the employers' terms, on the employers' timeframe or on the employers' turf. . . If the modules you are thinking about are developed with the notion of company specific customization, just-in-time education/training, linkages with customized labor training, or as the next step or stage in workplace education or workplace literacy, they will be well received."

The Student Experience

At this writing, only a few of the now-12 pilots have been implemented. Others were scheduled to begin in the second semester of the 96-7 academic year. Therefore, limited student feedback is available. The students' evaluations and follow-up assessments should become the subject of future reports. However, the preliminary findings reported by Delta, Macomb, and Northwestern are VERY encouraging.

The Faculty Experience

What was learned by each faculty team was somewhat different, but there were some common themes. The following represent the experience of at least one team, but most identified with most of the following:

- As learning goals and objectives were developed, the commonality of our expectations became increasingly evident, in spite of our often very different disciplines. Identifying core abilities as curricular themes was generally easy.
- As the content and approaches were merged, economies of "instruction" were identified, as multiple learning goals could be accomplished in interdisciplinary activities or projects.
- The inclination to divide up the course and have each work independently on sections to be re-combined was an early first instinctive response to the curriculum development.
- The importance of assessment became more clear, to not only know where students are beginning but also whether the goals have been achieved and the strategy effective.
- An emphasis on not only what a student must know but what they must be able to do to demonstrate their knowledge was difficult but important
- The recognition that the extent of students' learning will be greater as parts relate to other parts - causing a student to have a more complete understanding
- Technology is an essential component in the development of a quality curriculum, but it presents its own challenges as faculty need to have increased computer literacy - with advanced word processing capabilities, presentation software, spreadsheets, databases, curriculum development software, and more.
- Appreciation for the depth, breadth, and value of the skills possessed by other faculty and the rigor and integrity of the disciplines was increased
- Collaboration takes much more time
- Discovery can be a powerful learning approach, but framing it within a course with an instructor as the resource and just-in-time instruction or tapping the power of the team's expertise requires entirely new instructional approaches
- Enthusiasm and energy rises among team participants

Implementation Considerations

As mundane as these may seem, the administrative details can create obstacles. Consideration must be given to Credits, Pre- and post-assessment, Faculty Load (team teaching, course development), and Costs. A vehicle for resolving difficult areas must be in place.

Future Opportunities and Directions

- Virtual courses, programs, and colleges are a likely part of our future. Responsiveness to student and community (including employer) requirements will necessitate a more flexible and timely development of curriculum. Benefits cited in "The Virtual Curriculum: Computer-Assisted Curriculum Development" by Thomas Leitzel and Dan Vogler include: (a) industry executives and faculty as design teams, (b) an instantly created product based on client needs, © reduced staff time in course development, (d) mutual dependency on subject matter exchange, and (e) improved college-industry relations. They cite The Virtual Corporation: Structuring and Revitalizing the Corporation for the 21st Century, by W.H. Davidow and M. S. Malone in defining "virtual" as a product that is available at any time, in any place, and in any variety. *"Davidow and Malone posit that building a virtual product requires an organization to revise itself, employ more sophisticated types of information, and master new organizational and production skills. Through revision, what emerges will have little in common with what previously existed."*

- Technology has the potential to increase the effectiveness and efficiency of curriculum development and delivery. Data bases, interactive distance education, information networks, and more can be maximized in the enhancement of education.

- National networks of educators and business representatives interested in integration should emerge; preliminary informal ones already exist as a result of independent projects across the nation, including this one. Building upon others' experience will expedite the process, which is known to be slow.

- Incorporation of work-based learning components into integration models will become more important as all students will have this experience. The strategies for moving the learning from the classroom to the board room or tool room will be different still from those developed for multi-disciplinary courses.

- Alignment of these courses with high school curriculum, especially the model core curriculum and/or the state proficiency exams, will be an important articulation activity.

- Statewide recognition of "Best Curriculum Development" should be created so that others know who is innovating and can learn from others' experience. There is a great need to celebrate successes and build on others' work.

- A Michigan Community College Curriculum Integration Guide should be produced. This is a natural sequel activity of the work of the original eight teams and will be proposed for

the 1997-98 funding cycle. A preliminary guidebook was produced for the Summer 1996 Workshop.

- More assessment research and publication concerning successful models and their approaches and outcomes must be conducted.

- Four-year college articulation issues must be addressed.

Short-Term Recommendations

1. Publish curricula from existing projects in formats that could be adapted for use in other settings
2. Perform follow-up assessments of the students who participated in pilot courses
3. Continue the research into integrated curriculum - including visits to national community college sites which are more advanced in their development.
4. Continue the "dialogue" among the pilot projects for the professional development potential of continuing to share learning experiences
5. Utilize the existing teams to provide in-service education for future teaching and leadership teams
6. Continue funding of current-year projects to publish the curriculum, share the findings with many groups, and conduct evaluation studies
7. Launch a third project year with four-six additional community colleges.
8. Convene a Dialogue group or association around this topic. Curriculum and learning discussion opportunities are now limited. Information networks can be a valuable vehicle in this development.
9. Initiate a listserv dedicated to those identified as engaged with their college's curriculum integration efforts. (Planned for March 1997)

Concluding Comments

It is said that integration is less about what is taught than how it is taught. It is outcome driven. It is performance based. It builds on connections . . . in a context that matters or challenges or excites. In "Meeting the Mandate: Renewing the College and Departmental Curriculum," William Toombs and William Tierney write:

> *In the fullest sense, the curriculum is intended to serve all students by means of an experience that has enough unity to sustain a common discourse among the best trained and education. If students are to be in tune with a world few of their mentors have known, the course of study will have to be changed in fundamental ways still to be determined, discovered, or made. . .*
>
> *Analysis of the curriculum, for whatever purpose, at whatever level, is a critical feature of the practice situation in the academic profession. . . Changes in the curriculum to meet contemporary challenges are made in one of three ways: (1) modification or reform, the most familiar; (2) integration, perhaps the most*

difficult; and (3) transformation, a type of change that responds to complexity and uncertainty.

The good news is that there is not just one model for integrating curriculum. And, the bad news is that there is not just one model for integrating curriculum. The many different approaches, several of which are outlined in this paper, provide great flexibility for faculty in the development of their courses and programs. However, the many options may also confuse those who are just getting started. It is suggested that each college review the options and decide upon the approach which they will embrace within the institution. Whether it is learning communities; linked courses; new multi-disciplinary courses; case studies; or capstone approaches probably matters less than that the work begin. Each college is encouraged to take time to develop a template or set of guidelines for its institution and then provide the requisite professional development for staff to develop the new skills. The work of the early teams has suggested that integrated curriculum is more about pedagogy than content. Entirely new ways of approaching the teaching role are essential.

The Colleges' Projects

Delta College
University Center, Michigan
Rites, the Rights of Nursing, WRites"

The Delta Bio-Ethics - Nursing 100 project was designed as a Learning Community, where students participated in all three of the courses. Delta College's team includes a nursing faculty member, Dorothy Balish; English instructor Mary Beth Looby; and philosophy instructor Linda Plackowski. Dr. Betty Jones and John Flattery are the administrative liaisons. Delta faculty and administrative leaders have taken the development of Learning Communities very seriously. They have had several teams work on projects, including four or five courses each semester. They are conducting research to evaluate effectiveness and efficiency. While the additional costs of team teaching and extra development may be high, preliminary research from Delta's work suggests that the approaches may increase efficiency - because more students are retained. Delta College was the site of a successful state-wide Learning Communities conference which featured author Alfie Kohn and other Michigan and national learning leaders.

The core abilities for the pilot course at Delta include:

- Work collaboratively
- Communicate effectively
- Think critically and ethically
- Appreciate the impact of historical and contextual events on current events

Delta staff talk enthusiastically about the value of faculty teamwork. It's not about courses. . . . it's about modeling teamwork. They found it exciting to team up with faculty in content areas, but they acknowledge that the strategy requires a lot of joint planning time. They have come to describe part of what happens as "unprotected teaching." What the instructor does in the classroom is subject to total review of peers - an unusual occurrence in the higher education community. Their course will be presented for the first time in the fall of 1996. They expect the model to be well accepted, because all three courses are required (English, Philosophy, Nursing). Separate grades will be assigned for each course, but they will be linked. There will be 8 credits.

Henry Ford Community College
Dearborn, Michigan
"NSF Technical Physics Project"

Technical Physics at Henry Ford meets two days a week for 125 minutes each period. Modules establish daily objectives, timelines, and guidelines for the class activities. Frequent opportunities for discussion and inquiry are an important component of the discovery method pedagogy employed. Two distinctive course features are that (1) Each module describes and is framed within an industrial situation. The case method is employed in this approach. (2) The course makes use of microcomputer-based labs that involve students in activities like those encountered by technicians in the workplace.

Examples of the objectives from the Kinematics module include the following:

- Recognize the graphs of a moving object with an initial velocity.
- Understand the relationship between distance, velocity, and acceleration.
- Relate the graphs to the following equation of motion (include exact equations)
- Calculate the distance traveled by an object using the velocity-time graph
- Record and analyze the motion of a trunk lid

Rick Bailey, English instructor, commented that they want students to speak in fluent memorandums when they leave, because that's the major form of communication in the workplace. They ask students to write about "what did they know they knew, what did they sort of know, and what did they absolutely not understand." They use this technique not only as an evaluation of their own learning but for feedback on their instruction.

> *Students have to work a period of time with some mystery. Students want it to be clean, but work is messy, so the classroom is a model of reality. They are also learning to work with each other: teamwork. They make use of each others' comments. Teams are pretty independent now.*

Teamwork among students is an important dimension in lab exercises, but students' performance is graded on an individual basis. An Industrial Advisory Board helped to create the course and provided real-world contexts for the modules. The manual will be produced in both paper and disk versions. A draft of Unit 1 is provided in the Appendix.

Bob Eschelman, physics instructor, commented that he would now feel comfortable to do the teach alone, because he has learned where the writing opportunities are and how to structure the learning activities. Stan Briggs, Electronics, is another key member of this team.

Henry Ford has been at the development of their course for a longer period because they were successful in acquiring a National Science Foundation (NSF) Advanced Technological Education Program grant for development of their course which has provided them with extra resources, including the assistance of consultants on instructional design. Year 2 of the program has expanded the program into the high school and includes close connections with Tech Prep.

Macomb County Community College
Warren, Michigan
"Softening the Hard Line: Business and Technology Help Shape
an Interdisciplinary Writing Course."

Writing in Context: Business and Technical, is the focus of this project. Team members are Les Beecher, English; Brian Hamilton from Technology; and Fred Jex of Accounting.

Core abilities identified for the COR292 course are:

1. Communicate effectively, in writing and orally, to a variety of audiences.
2. Demonstrate an understanding of the relationship among the disciplines of English, technology, and business.
3. Acquire and apply collaborative skills to achieve goals.
4. Acquire and apply critical thinking skills to solve problems.
5. Anticipate and respond to change in a balanced and productive way.

COR 292 includes English 118, Technology 292, and Business 292. The class meets for five hours each week; in its first offering, it was scheduled from 5-9:30 p.m. The five credits are determined from the core English course of 4 and adding ½ credit each of Business and Technical credits. Fall enrollees are all males employed full-time in the automotive industry and working 40-60 hours per week and enrolled for this and another technology course. Many are involved with Chrysler's V-6 Flex Line, which became the basis for the major project: an eight-part report on the V-6 Flex Line. Students also make formal oral presentations on their work.

One example of a writing assignment for Part Seven: Cost Analysis is to use "Cause-and-Effect Analysis" to analyze the probable effect(s) on company profits as a result of replacing the old line with the new V-6 line. An essay of 500-750 words is requested. Course competencies provided in the Appendix offer more detail about the content, assignments, and standards established for the course.

Examples of the text materials provide valuable insights to the perspectives shared in the class, as assigned books include Lynn Troyka's Handbook for Writers; Robert Lacey's Ford: The Man and the Machine; and Tim O'Brien's The Things They Carried.

The Year 2 team at Macomb is combining English, with Les Beecher again, plus a civil engineering instructor and mathematics instructor Carolyn West.

Northwestern Michigan College
Traverse City, Michigan
$I \int Q = E^3$

The project title evolved from the finding early in the team's work that the essential skills for manufacturing employment, as validated by hundreds of U.S. companies, were also the skills important for work in engineering, science, business, commercial art, and other industries. They would also be important for education success. So what began to be a specialized course to meet the national skills standards for advanced manufacturing evolved into one that the team expects to be well suited for a comprehensive development of essential skills: thus, the title: Integrate for Quality Equals the Essentials for Education and Employment ($I \int Q = E^3$).

A virtual manufacturing skills standards course was the focus of the development of the NMC team. Designed around a case-study approach utilizing a U.S. company, Harley-Davidson, the skills identified for entry-level workers in high-performance manufacturing organizations were the content. Topic areas included:

- Communication and Teamwork
- Math and Measurement
- Workplace Safety and Health
- Problem Solving
- Quality Assurance
- Blueprint Reading
- Manufacturing Fundamentals
- Business Planning and Operation
- Computer Use
- Product and Process Control
- Workforce Issues
- Workplace Skills
- Learning Skills

The project is designed to address both local and national demand for more highly skilled employees in advanced manufacturing industries with as multidisciplinary, integrated learning program using case studies based on real-world, worksite situations.

Utilizing significant portions of the WIDS design philosophy (goals, objectives, standards), team members designed case studies to integrate the essential learning. A just-in-time approach is envisioned, as particular needs are identified for target audiences. The "course" is designed to meet the introductory learning requirements of persons interested in pursuing a manufacturing career (first-year college students) as well as currently employed individuals in a-manufacturing environment. Cases and content may be modified for different environments.

Identified core abilities are:

- Communicate clearly and accurately
- Think creatively and critically
- Use problem-solving skills

- Analyze and manipulate quantitative relationships
- Create a quality product and value quality processes
- Work as a member of a team; collaborate successfully
- Apply appropriate technology

NMC's team was also influenced by the Alverno model as close to 25 percent of NMC's faculty and instructional administrators have gained considerable perspective about their ability-based learning programs. Plans are to increasingly incorporate components of their levels of performance into the core abilities identified for this and other courses.

The team includes Stephen Drake, Mathematics; John Pahl, English; John Pflughoeft, Math and Engineering; Jill Hinds, Visual Communications/Commercial Art; Stan Sidor, Industry Training; Roberta Teahen, Business.

The NMC course will be tested beginning in March 1997 with employees of the Dura Automotive Systems as part of that company's commitment to Team training. The goal is to certify trainees in their performance on the National Skills Standards. Although the course will be team taught at least the first time, it is designed to be sufficiently well documented that any one of the individuals would be able to facilitate its execution for future offerings. Software standards were established with WORD, Excel, and Powerpoint.

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